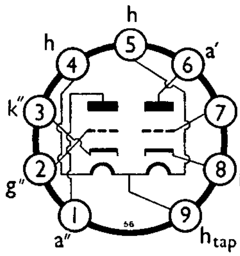
MINIATURE
DOUBLE TRIODE
12·6V INDIRECTLY HEATED

B309

DECEMBER, 1954

The B309 is a commercial equivalent to the CV455.

BASE CONNECTIONS AND VALVE DIMENSIONS



View from underside of base.

Base : B9A
Bulb : Tubular

Overall length :	49—55	mm.
Seated length :	43—49	mm.
Max. Diameter :	22	mm.

RATING

V_h	12·6		6·3	V
I_h	0·15		0·3	A
V_{h-k}		100 max.		V
V_a		300 max.		V
p_a (per system)		2·5 max.		W
μ	at $V_a=250$, $V_g=-2$	55		
r_a	at $V_a=250$, $V_g=-2$	10		kΩ
g_m	at $V_a=250$, $V_g=-2$	5·5		mA/V

CAPACITANCES (of unscreened valve)

$c_{a'-g'}$	1·6	pF	$c_{a''-g''}$	1·6	pF
$c_{g'-k'}$	2·5	pF	$c_{g''-k''}$	2·5	pF
$c_{a'-k'}$	0·4	pF	$c_{a''-k''}$	0·4	pF
$c_{a'-a''}$	0·4	pF			

TYPICAL OPERATION

A.F. amplifier. Class A

Per system

V_a (b)	250	V
$V_{g\ approx}$	−2	V
v_{out} (pk) (D=1%)	7	V
v_{out} (pk) (D=2%)	14	V
V_{gain}	37	
I_a	1·4	mA
R_k	1·2	kΩ
R_a	100	kΩ

Under maximum rated conditions, the grid-cathode D.C. resistance must not exceed 1MΩ per system.

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Head Office: Marconi House, Chelmsford . Telephone: Chelmsford 3221 . Telegraphic Address: Expanse, Chelmsford

MOUNTING

Any position.

SCREENING

No internal or external screening is fitted to the valve.

VENTILATION

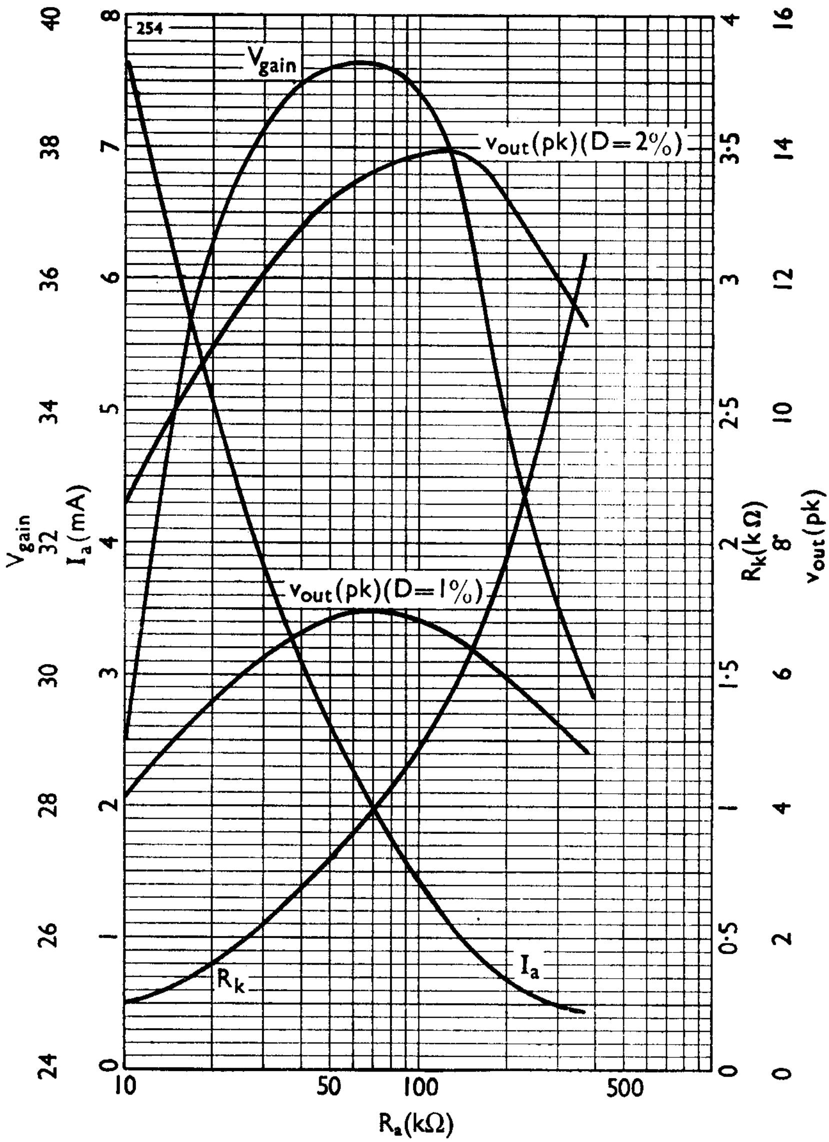
No special precautions.

MICROPHONY

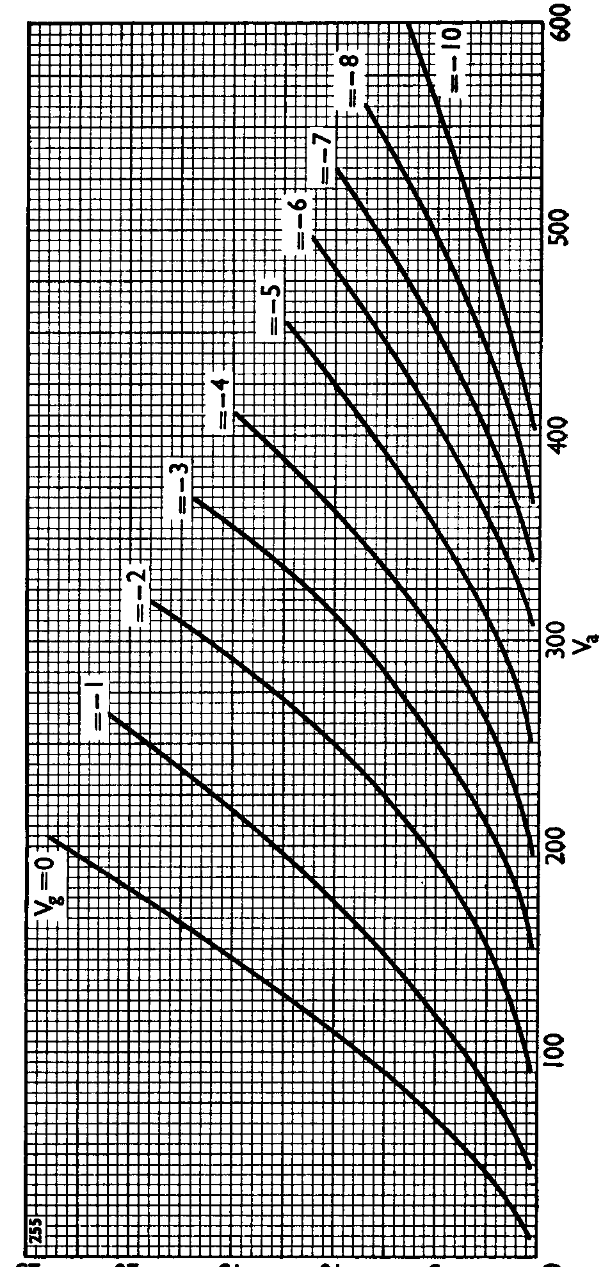
The valve should be free from microphony in normal receiver applications

CLASS A AF AMPLIFIER

following $R_{g1\text{-}k} = 470k\Omega$



B309



$V_g = 0$
= −1
= −2
= −3
= −4
= −5
= −6
= −7
= −8
= −10
I_a (mA)
V_a
0
5
10
15
20
25
100
200
300
400
500
600
255

The Rating and Characteristics of the B309 are given in the Technical Data Sheet.

The B309 is a commercial equivalent of CV455.

The B309 is a double triode suitable for use in a variety of circuits, the separate connections to the cathodes providing complete flexibility.

The valve is satisfactory as a multivibrator, and as such has applications in television receivers as a line or frame oscillator. It is also useful in many industrial applications.

AUDIO FREQUENCY AMPLIFICATION

The valve may be used either in push-pull or cascade in resistance or transformer coupled amplifiers. An anode load resistor of 33kΩ to 100kΩ is suitable, and a stage gain of the order of 40 is obtainable from each triode system. A circuit covering its use as a self-balancing phase inverter is shown in fig. 1 ; the gain of this circuit is 80 overall.

When the grid is earthed via a resistor of 250kΩ the hum voltage will not exceed 30 db below 1 mV, assuming a 6·3V heater supply and a hum-balancing resistor. The valve should not be used in the first stage of a high gain amplifier, but in the later stages its microphonic performance is satisfactory.

RADIO FREQUENCY AMPLIFICATION

The B309 may be used with either earthed cathode or earthed grid. In the former case neutralisation is necessary to prevent self-oscillation. Optimum results are obtained in a push-pull circuit and a stage gain of not less than 10 db is obtainable at frequencies up to 200 Mc/s. As a push-pull earthed grid amplifier it has an input impedance of 350 Ω. The recommended circuit is shown in fig. 2. Measurements made with the valve operating as a driven Class C amplifier with earthed cathodes show a stage gain of 7 to 10 db.

CLASS C OSCILLATOR

The following performance has been obtained using lumped circuits.

Frequency	Output
30 Mc/s	5·5W
125 Mc/s	2·5W
250 Mc/s	1·1W

Using lines an output of 2·5W can be obtained at 250 Mc/s. The recommended circuit is shown in fig. 3.

FREQUENCY CHANGER

As a mixer the B309 will operate satisfactorily with common grid injection at frequencies up to 400 Mc/s. A small capacitance connected between the signal grid and oscillator circuit is used to inject the oscillator voltage.

A voltage of 3 to 5 will give good conversion, and at the higher frequencies the stray capacitances between the signal and oscillator circuits enable the external capacitor to be omitted.

The choice of intermediate frequency is governed by the signal frequency. Serious pulling between the oscillator and signal circuits will result if the two frequencies are allowed to approach each other too closely.

The recommended circuit is shown in fig. 4. In this circuit the values of C1 and C2 will depend on the constants of the intermediate frequency transformer. C3, shown in dotted lines, is an alternative position for C1.

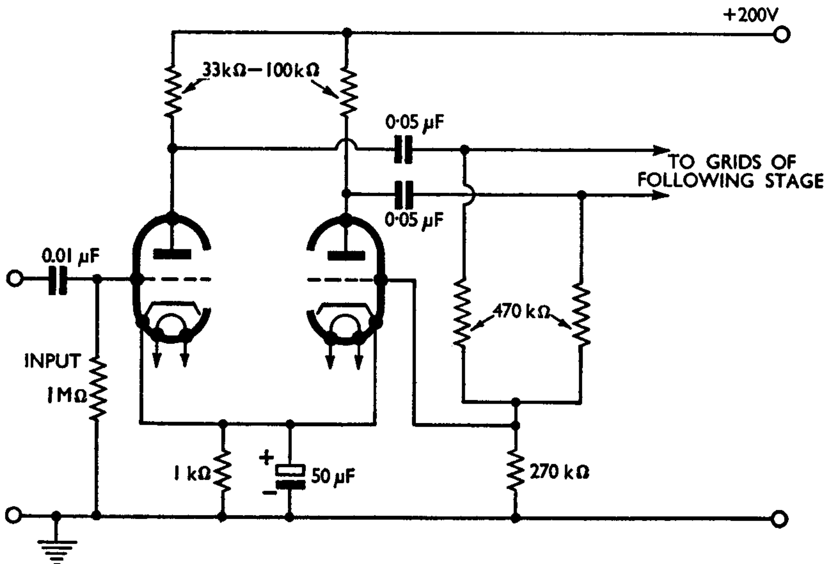


FIG. 1. Self-balancing phase inverter.

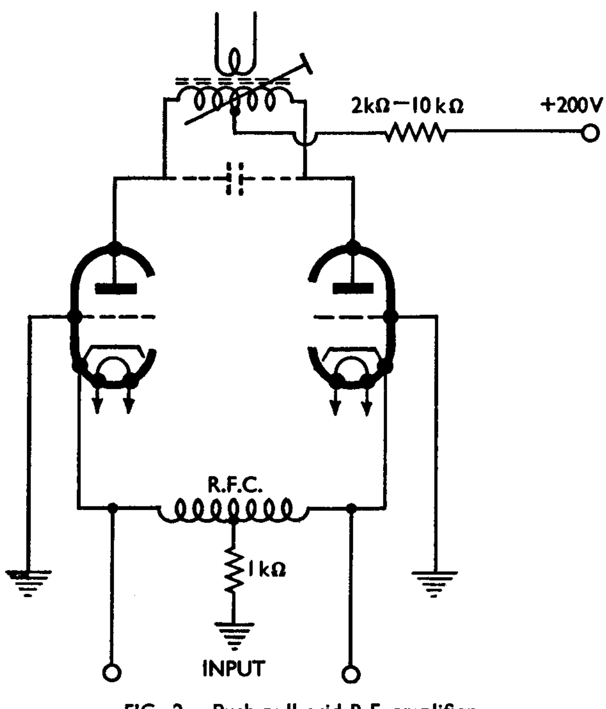


FIG. 2. Push-pull grid R.F. amplifier.

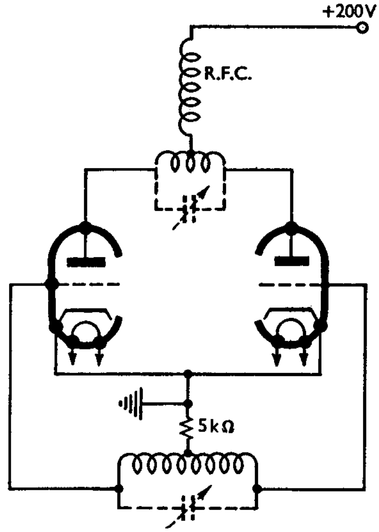


FIG. 3. Class C oscillator.

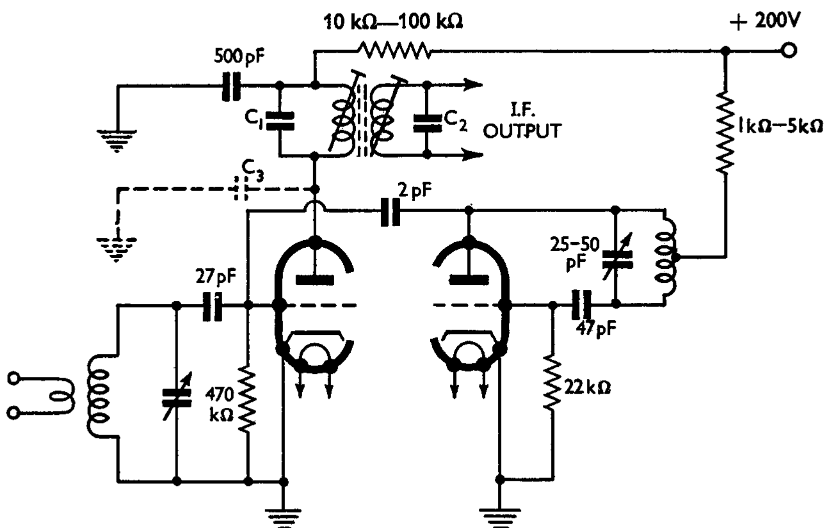


FIG. 4. V.H.F. frequency changer.

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